Reprinted from SCIENCE, June 11, 1954, Vol. 119, No. 3102, pages 850–851.

# The Spectrum of Magnesium in Concentrated Sulfuric Acid

Niemann and Ikawa (*1, 2*) have shown that the type and amount of a carbohydrate in solution can be found from its spectrum in the 210 to 400 mμ region in strong mineral acid. In some cases, a quantitative determination of one monosaccharide can be made in an admixture of other monosaccharides, and some polysaccharides can be resolved into their component monosaccharide units. These determinations are based on the production of various furfurals by the monosaccharides on heating in strong mineral acid, each class of monosaccharides condensing into a slightly different furfural.

In crude preparations of carbohydrates, taken from sea water by extraction on charcoal, alumina, and other adsorbents, a discrepancy of 4 to 5 mg/liter in a total of 20 to 25 mg/liter was noted between the amounts of carbohydrates found by examination of the sulfuric acid spectra in the 210 to 400 mμ region and those found by the N-ethylcarbazole method. Since both methods depend on the formation of a furfural in concentrated sulfuric acid, it was apparent that some compound or compounds other than carbohydrates, could produce ultraviolet spectra similar to those of the furfurals, in hot sulfuric acid.

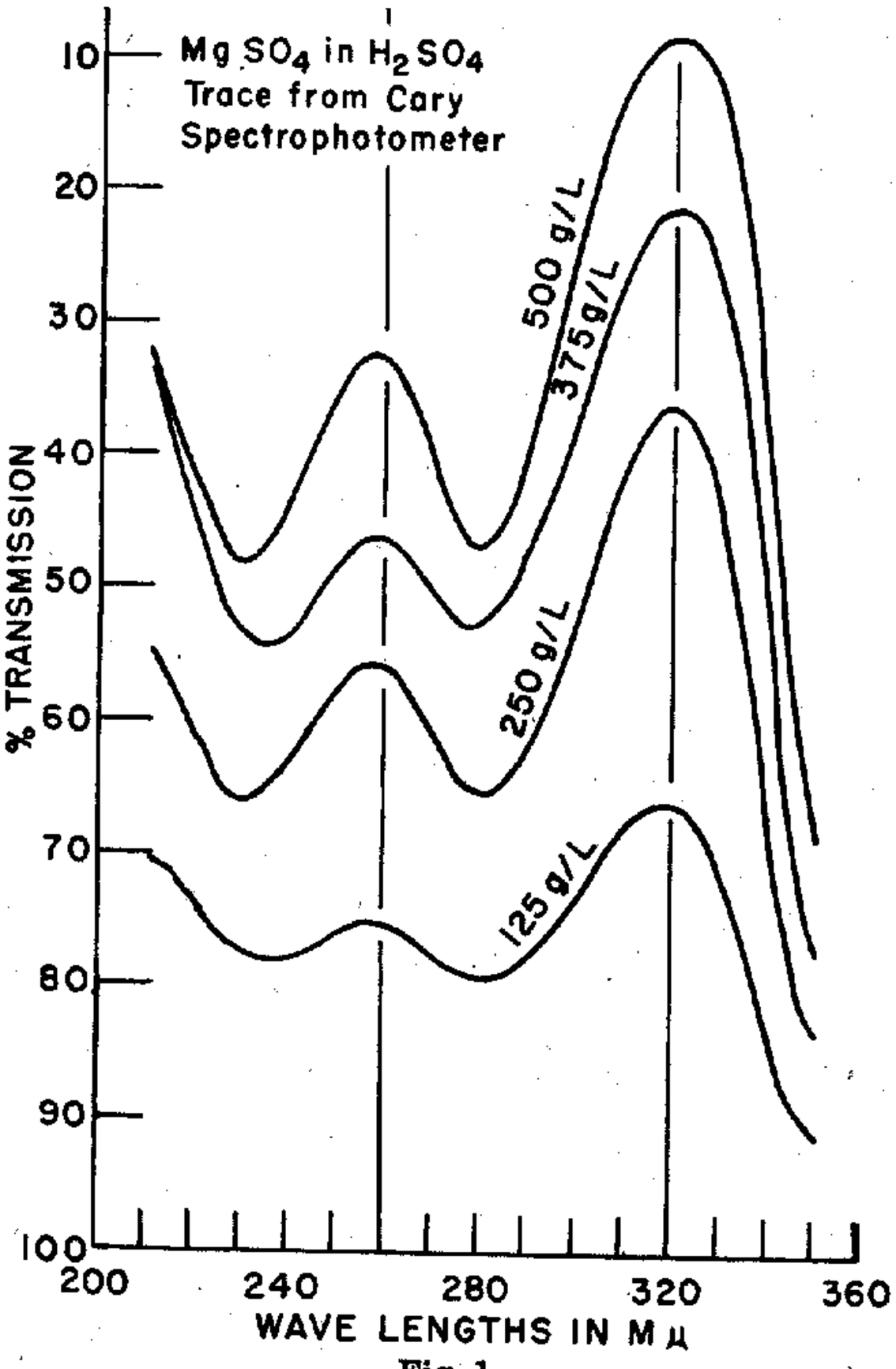


Fig. 1.

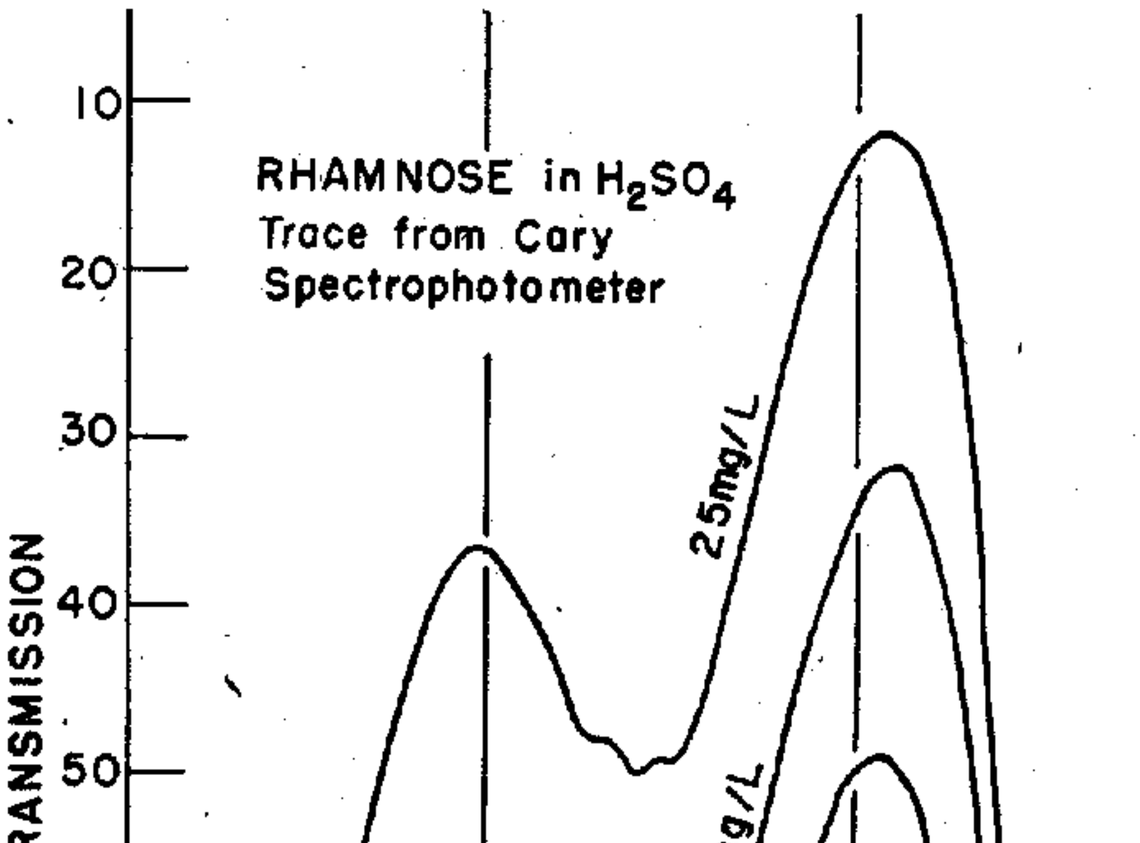


Fig. 2.

By a process of elimination, the substance was found to be magnesium. Figures 1 and 2 show the close correspondence between the sulfuric acid spectra of high concentrations of magnesium sulfate and those of a methyl pentose, rhamnose. Certain polysaccharides and some mixtures of monosaccharides duplicate even more closely the spectrum given by magnesium. While the concentrations of magnesium sulfate necessary to give these spectra may seem absurdly high, in working with crude preparations in which the carbohydrate concentration is very low, concentrations of magnesium of this order may occur. The normal concentration of magnesium in sea water is about 1.3 g/liter. However, magnesium is picked up very readily by a great number of adsorbents and concentrated easily to 50 or 100 times its normal concentration. Exceedingly thorough dialysis is necessary to remove all traces of magnesium.

PETER J. WANGERSKY
*U.S. Fish and Wildlife Service*
*Fort Crockett, Galveston, Texas*

### References

1. M. Ikawa and C. Niemann, *J. Biol. Chem.* **180**, 923 (1949).
2. M. Ikawa and C. Niemann, *Arch. Biochem. and Biophys.* **31**, 62 (1951).

Received January 18, 1954.